



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/019,087	02/05/98	ENOMOTO	H TIJ-24816

023494 IM22/0705  
TEXAS INSTRUMENTS INCORPORATED  
P O BOX 655474, M/S 3999  
DALLAS TX 75265

EXAMINER	
PEREZ RAMOS, V	
ART UNIT	PAPER NUMBER

1765

DATE MAILED:

07/05/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09/019087

Applicant(s)

Enomoto et al.

Examiner

V. Perez-Ramos

Group Art Unit

1765

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

## Period for Response

A SHORTENED STATUTORY PERIOD FOR RESPONSE IS SET TO EXPIRE 13 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a response be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for response is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to respond within the set or extended period for response will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

- ☒ Responsive to communication(s) filed on 4-24-00
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1-4, 11 is/are pending in the application.
- Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 1-11 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.
- ☐ received in this national stage application from the International Bureau (PCT Rule 1.7.2(a)).

\*Certified copies not received: \_\_\_\_\_.

## Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_
- ☒ Notice of References Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other \_\_\_\_\_

Office Action Summary

Art Unit: 1765

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuji (U.S. 5,514,625) in view of Harari (U.S. 4,933,739).

In regard to claims 1-3, Tsuji teaches a method of manufacturing a semiconductor device comprising: forming an insulating film over a substrate (col. 5, lines 7-10), forming a first mask on said insulating film (col. 5, line 24) and forming a resist film on the first mask film (col. 5, line 18). This resist film serves as a mask during the etching process (col. 5, lines 32-35) to form an opening (col. 5, lines 29-31), which is followed by the formation of trenches on said insulating film (col. 5, lines 26-28). Furthermore, Tsuji teaches the formation of a second mask film (col. 5, line 46) and its use as an etching mask during the formation of connecting holes (col. 5, lines 44-50). Tsuji also teaches the formation of a wiring layer by burying an electroconductive material in the trenches (col. 7, lines 19-23). Furthermore, Tsuji discloses that the second mask is located in the same position where the next opening would be later etched. Given the fact that the second opening in Applicant's invention is etched through the sidewalls covered with the second

Art Unit: 1765

mask film, it is the Examiner's position that Tsuji's disclosure about the position of the openings etched after deposition of the second mask read on Applicant's limitation of "the second mask film covering sidewalls and a bottom of the trenches".

Unlike the claimed invention, Tsuji does not disclose the removal of the first and second mask films, nor does he disclose the trenches having sidewalls.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tsuji by removing the first and second mask films during the semiconductor manufacturing process, since it is well known in the art of semiconductor manufacturing that masks are meant to be removed after etching and other processes.

Furthermore, although Tsuji does not explicitly disclose that his trenches have sidewalls, it is well known to any skilled in the art that a trench has sidewalls, as it has sides and the "walls" that form its sides are its sidewalls. Evidence can be found by referring to any one of Tsuji's Fig. 4-8, where it can be noted that the trench formed has sidewalls. Furthermore, Harari explicitly discloses the fact that a trench has sidewalls (col. 24, line 30). Therefore, and as stated above, even though Tsuji does not explicitly disclose that his trenches have sidewalls, this is an inherent property of a trench, as evidenced by Harari.

In regard to claims 4, 7 and 9, these claims differ from Tsuji by specifying various materials for the insulating film. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tsuji by using different materials to form the insulating

Art Unit: 1765

film in anticipation of an expected result, since the use of such different materials is well known in the art of semiconductor manufacturing.

In regard to claims 5-6, 8 and 10-11, these claims differ from Tsuji by specifying that the holes are in contact with the lower electrodes in the capacitors of the memory cells, and by disclosing that capacitors are set for storing information. It is the Examiner's position that these are conditions well known in the semiconductor art, and that it would have been obvious to modify Tsuji by disclosing the above-mentioned information.

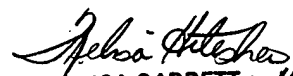
*Response to Arguments*

3. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Perez-Ramos whose telephone number is (703) 306-5510.

VPR

June 6, 2000

  
FELISA GARRETT  
PRIMARY EXAMINER  
AU1765